



$$\tan (A+B+C)=\frac{\tan A+\tan B+\tan C-\tan A.\tan B.\tan C}{1-\tan A.\tan B-\tan B.\tan C-\tan C.\tan A}$$

Put $B=C=A$

$$\tan 3A = \frac{3 \tan A - \tan^3 A}{1 - 3 \tan^2 A}$$

ee





$$\tan (A+B+C)=\frac{\tan A+\tan B+\tan C-\tan A.\tan B.\tan C}{1-\tan A.\tan B-\tan B.\tan C-\tan C.\tan A}$$

If, $A+B+C = 90^\circ$

$$\tan 90^\circ = \frac{\tan A+\tan B+\tan C-\tan A.\tan B.\tan C}{1-\tan A.\tan B-\tan B.\tan C-\tan C.\tan A}$$

$$\frac{1}{0} = \frac{\tan A + \tan B + \tan C - \tan A.\tan B.\tan C}{1 - \tan A.\tan B - \tan B.\tan C - \tan C.\tan A}$$

$$\tan A.\tan B + \tan B.\tan C + \tan C.\tan A = 1$$





$$\tan (A+B+C)=\frac{\tan A+\tan B+\tan C-\tan A.\tan B.\tan C}{1-\tan A.\tan B-\tan B.\tan C-\tan C.\tan A}$$

If, $A+B+C = 180^\circ$ or in $\triangle ABC$.

$$\tan 180^\circ = \frac{\tan A+\tan B+\tan C-\tan A.\tan B.\tan C}{1-\tan A.\tan B-\tan B.\tan C-\tan C.\tan A}$$

$$\frac{0}{1} = \frac{\tan A+\tan B+\tan C-\tan A.\tan B.\tan C}{1-\tan A.\tan B-\tan B.\tan C-\tan C.\tan A}$$

$$0 = \tan A + \tan B + \tan C - \tan A.\tan B.\tan C$$

$$\tan A + \tan B + \tan C = \tan A.\tan B.\tan C$$

$$\cot A.\cot B + \cot B.\cot C + \cot C.\cot A = 1$$

$\div \tan A.\tan B.\tan C$

$\curvearrowright$

91. In a ΔABC , $\tan \frac{A}{2} \cdot \tan \frac{B}{2} + \tan \frac{B}{2} \cdot \tan \frac{C}{2} + \tan \frac{C}{2} \cdot \tan \frac{A}{2} = ?$

[A] 0

[C] -1

☒ [B] 1

[D] 2

$$\frac{A}{2} + \frac{B}{2} + \frac{C}{2} = 90^\circ$$



92. Find the value of $\tan 27^\circ \tan 34^\circ + \tan 34^\circ \tan 29^\circ + \tan 29^\circ \tan 27^\circ$?
 $\tan 27^\circ \tan 34^\circ + \tan 34^\circ \tan 29^\circ + \tan 29^\circ \tan 27^\circ$ का मान ज्ञात कीजिए?

[A] 0

[C] $\sqrt{3}$

[B] -1

☒ [D] 1

$$27^\circ + 34^\circ + 29^\circ = 90^\circ$$



93. If $\tan 4A * \tan 5A + \tan 5A * \tan 6A + \tan 6A * \tan 4A = 1$, then find the value of $\frac{\sec 10A}{\operatorname{cosec} \frac{15A}{2}}$?

यदि $\tan 4A * \tan 5A + \tan 5A * \tan 6A + \tan 6A * \tan 4A = 1$ है, तो $\frac{\sec 10A}{\operatorname{cosec} \frac{15A}{2}}$ का मान ज्ञात कीजिये?

[A] $\sqrt{3}$

[B] $\sqrt{2}$

[C] $2\sqrt{2}$

[D] 2

$$\frac{2}{\sqrt{2}} = \sqrt{2}$$

$$4A + 5A + 6A = 90^\circ$$

$$15A = 90^\circ$$

$$A = 6^\circ$$



94. Find the value of $\cot 50^\circ * \cot 55^\circ + \cot 55^\circ * \cot 75^\circ + \cot 75^\circ * \cot 50^\circ - 5$?

$\cot 50^\circ * \cot 55^\circ + \cot 55^\circ * \cot 75^\circ + \cot 75^\circ * \cot 50^\circ - 5$ का मान ज्ञात कीजिये?

[A] -2

1

[B] 4

[C] 0

[D] -4 ✓

$$50^\circ + 55^\circ + 75^\circ = 180^\circ$$



95. Find $\frac{\cot 20^\circ + \cot 50^\circ}{\tan 20^\circ + \tan 50^\circ} + \frac{\cot 50^\circ + \cot 110^\circ}{\tan 50^\circ + \tan 110^\circ} + \frac{\cot 110^\circ + \cot 20^\circ}{\tan 110^\circ + \tan 20^\circ}$?

$\frac{\cot 20^\circ + \cot 50^\circ}{\tan 20^\circ + \tan 50^\circ} + \frac{\cot 50^\circ + \cot 110^\circ}{\tan 50^\circ + \tan 110^\circ} + \frac{\cot 110^\circ + \cot 20^\circ}{\tan 110^\circ + \tan 20^\circ}$ ज्ञात कीजिये?

[A] 1

[B] $\frac{1}{2}$

[C] $\frac{3}{2}$

[D] 3

$\cot 20^\circ \cot 50^\circ + \cot 50^\circ \cot 110^\circ + \cot 110^\circ \cot 20^\circ = 1$

$\frac{\cot 20^\circ + \cot 50^\circ}{\tan 20^\circ + \tan 50^\circ} = \cot 20^\circ \cot 50^\circ$



96. In a triangle XYZ, $\tan X = 2$ and $\tan Y = 4$, then what is the value of $\tan Z$?

एक त्रिभुज XYZ में $\tan X = 2$ और $\tan Y = 4$ है, तो $\tan Z$ का मान क्या है?

[A] $6/5$

[C] $5/6$

[C] $6/7$

[D] $7/6$

$$\tan X + \tan Y + \tan Z = \tan X \cdot \tan Y \cdot \tan Z$$

$$2 + 4 + \tan Z = 8 \tan Z$$

$$\frac{6}{7} = \tan Z$$





97. If $\tan(A + B) = \frac{1}{2}$, $\tan(A - B) = \frac{1}{3}$, Then find the value of $\tan 2A$?

अगर $\tan(A + B) = \frac{1}{2}$ और $\tan(A - B) = \frac{1}{3}$ है, तो $\tan 2A$ का मान ज्ञात कीजिए?

[A] 5

[B] 7

[C] 1 ✓

[D] 3

$$= \tan[(A+B) + (A-B)]$$

$$\angle A = 22.5^\circ$$

$$= \frac{\frac{1}{2} + \frac{1}{3}}{1 - \frac{1}{2} \times \frac{1}{3}}$$
$$= \frac{\frac{5}{6}}{\frac{5}{6}} = 1$$



98. If $\tan\theta - \tan\phi = x$ and $\cot\phi - \cot\theta = y$, then $\cot(\theta - \phi) = ?$

[A] $\frac{1}{x} - \frac{1}{y}$

[C] $x + y$

[B] $\frac{1}{x} + \frac{1}{y}$

[D] $\frac{1}{y} - \frac{1}{x}$

$$\cot(\theta - \phi) = \frac{\cot\theta \cdot \cot\phi + 1}{\cot\phi - \cot\theta} = \frac{\frac{y}{x} + 1}{y} = \frac{1}{x} + \frac{1}{y}$$

$$\frac{1}{\cot\theta} - \frac{1}{\cot\phi} = x$$

$$\frac{y}{\cot\theta \cdot \cot\phi} = x$$



99. If $\cos(\alpha + \beta) = 4/5$, $\sin(\alpha - \beta) = 5/13$ & α, β lie between 0 & $\frac{\pi}{4}$. Find $\tan 2\alpha$.

यदि $\cos(\alpha + \beta) = 4/5$, $\sin(\alpha - \beta) = 5/13$ और α, β $(0$ और $\frac{\pi}{4})$ के बीच स्थित है। $\tan 2\alpha$ खोजें।

[A] 45/22

[C] 63/55

[B] 56/33

[D] 13/45

$$\tan 2\alpha = \tan[(\alpha + \beta) + (\alpha - \beta)]$$

$$= \frac{\frac{3}{4} + \frac{5}{12}}{1 - \frac{3}{4} \times \frac{5}{12}}$$

$$= \frac{\frac{56}{48}}{\frac{33}{48}} = \frac{56}{33}$$

$$\tan(\alpha + \beta) = \frac{3}{4}$$

$$\tan(\alpha - \beta) = \frac{5}{12}$$



100. If $\tan\alpha = \frac{m}{m+1}$, $\tan\beta = \frac{1}{2m+1}$ then find the value of $(\alpha+\beta)$?

यदि $\tan\alpha = \frac{m}{m+1}$ और $\tan\beta = \frac{1}{2m+1}$ है, तो $(\alpha+\beta)$ का मान ज्ञात कीजिए।

[A] $\frac{\pi}{2}$
[C] $\frac{\pi}{3}$

[B] $\frac{\pi}{4}$
[D] $\frac{\pi}{6}$

put $m=1$

$\tan\alpha = \frac{1}{2}$

$\tan\beta = \frac{1}{3}$

$\tan(\alpha+\beta) = \frac{\frac{1}{2} + \frac{1}{3}}{1 - \frac{1}{2} \times \frac{1}{3}} = 1$



101. If $\tan A = \frac{1}{2}$, $\tan B = \frac{1}{5}$, $\tan C = \frac{1}{8}$ Then $A + B + C = ?$

यदि $\tan A = \frac{1}{2}$, $\tan B = \frac{1}{5}$, $\tan C = \frac{1}{8}$ है, तो $A + B + C = ?$

[A] 135°

[B] 45°

[C] 60°

[D] 90°

$$\begin{aligned}\tan(A+B+C) &= \frac{\frac{1}{2} + \frac{1}{5} + \frac{1}{8} - \frac{1}{80}}{\frac{1}{80} - \frac{1}{10} - \frac{1}{40} - \frac{1}{16}} \\ &= \frac{40 + 16 + 10 - 1}{80 - 8 - 2 - 5} = \frac{65}{65} = 1\end{aligned}$$





If, $A = B + C \rightarrow \tan A = \tan(B+C)$

$$\tan A = \frac{\tan B + \tan C}{1 - \tan B \cdot \tan C}$$

$$\tan A \cdot (1 - \tan B \cdot \tan C) = \tan B + \tan C$$

$$\tan A - \tan A \cdot \tan B \cdot \tan C = \tan B + \tan C$$

$$\tan A - \tan B - \tan C = \tan A \cdot \tan B \cdot \tan C$$



102. If $\tan A - \tan B - \tan C = \tan A \tan B \tan C$, what is the value of A in terms of B and C?

यदि $\tan A - \tan B - \tan C = \tan A \tan B \tan C$ है, तो B और C के संदर्भ में A का मान क्या है?

☒ [A] $A = B + C$

[B] $A = 2B - 2C$

[C] $A = B - C$

[D] $A = \frac{B - C}{2}$

(CHSL 2004 POC)

$$A = B + C$$



103. $\tan 13x - \tan 9x - \tan 4x = ?$

[A] $\cot 13x \cdot \cot 9x \cdot \cot 4x$

[B] $\tan 13x \cdot \tan 9x \cdot \tan 4x$

[C] $1 + \tan 4x \cdot \tan 9x$

[D] None

$$13x = 9x + 4x$$



104. $\tan 73^\circ \tan 48^\circ \tan 25^\circ = ?$

[A] $\tan 25^\circ + \tan 48^\circ - \tan 73^\circ$

[B] $\tan 73^\circ + \tan 25^\circ + \tan 48^\circ$

☒ [C] $\tan 73^\circ - \tan 25^\circ - \tan 48^\circ$

[D] $\tan 25^\circ - \tan 48^\circ - \tan 73^\circ$

$73^\circ = 48^\circ + 25^\circ$





105. $\tan\left(\frac{\pi}{4} + \theta\right) + \tan\left(\frac{\pi}{4} - \theta\right) = ?$

[A] $2\sin 2\theta$ ✗

[B] $2\tan 2\theta$ ✗

[C] $2\sec 2\theta$ ✗ $= 2 \times \frac{2}{\sqrt{3}}$

[D] $2\cos 2\theta$ ✗

$\tan(45^\circ + \theta) + \tan(45^\circ - \theta)$

but $\theta = 15^\circ$

$\sqrt{3} + \frac{1}{\sqrt{3}} = \frac{4}{\sqrt{3}}$



106. Find the value of $\left[\frac{4\cos(90^\circ - \theta)\sin^3(90^\circ + \theta) - 4\sin(90^\circ + \theta)\cos^3(90^\circ - \theta)}{\cos\left(\frac{180^\circ + 8\theta}{2}\right)} \right]$.

$\left[\frac{4\cos(90^\circ - \theta)\sin^3(90^\circ + \theta) - 4\sin(90^\circ + \theta)\cos^3(90^\circ - \theta)}{\cos\left(\frac{180^\circ + 8\theta}{2}\right)} \right]$ का मान ज्ञात कीजिए।

[A] -1

[C] 2

[B] 1

[D] 0

$$\frac{4\cancel{S}C^3 - 4C\cdot\cancel{S}^3}{-8\sin 4\theta}$$

$$\cos(90^\circ + 4\theta)$$

$$\begin{aligned} & \frac{\cancel{4S} \times \cancel{C^3} \times \cancel{6820}}{-8\sin 4\theta} \\ &= -1 \end{aligned}$$



107.

$$\sqrt{2 + \sqrt{2 + \sqrt{2 + \sqrt{2 + 2\cos 16x}}}} = ?$$

[A] $2\cos^2 x$

[B] $2\left(1 - \cos^2 \frac{x}{2}\right)$

[C] $2\left(1 - 2\sin^2 \frac{x}{2}\right)$

[D] $2\left(2\cos^2 \frac{x}{2} + 1\right)$

$$1 + \cos 2\theta = 2\cos^2 \theta$$

$$\sqrt{2 + 2\cos 2\theta} = \sqrt{4\cos^2 \theta} = 2\cos \theta$$

$$= 2\cos x$$

$$= 2\left(1 - 2\sin^2 \frac{x}{2}\right)$$



108. $\sqrt{\frac{(1+\cot x + \tan x)(\sin x - \cos x)}{\sec^3 x - \operatorname{cosec}^3 x}} = ?$

[A] $\frac{\sin^2 x \cos^2 x}{2}$

[B] $\frac{\sin 4x}{4}$

[C] $\frac{\sin 2x}{2}$

[D] $\frac{\cos 4x}{4}$

$$\sqrt{\frac{(1 + \frac{1}{\sec x}) \cdot (\sin x - \cos x)}{\frac{1}{\cos^3 x} - \frac{1}{\sin^3 x}}} = \sqrt{\frac{(\frac{\sec x + 1}{\sec x}) \cdot (\sin x - \cos x)}{\frac{\sin^3 x - \cos^3 x}{\cos^3 x \sin^3 x}}} = \frac{2 \sin x \cos x}{2} = \sin 2x$$



109. $\left(\cot \frac{\pi}{32} - \tan \frac{\pi}{32} \right) - 2 \tan \frac{\pi}{16} = ?$

[A] $4 \cot \frac{\pi}{8}$

$2 \cot \frac{\pi}{16} - 2 \tan \frac{\pi}{16}$

[B] $4 \tan \frac{\pi}{8}$

[C] $2 \cot \frac{\pi}{8}$

$= 2 \times 2 \cot \frac{\pi}{8}$

[D] $\cot \frac{\pi}{8}$

$\cot \theta + \tan \theta = \frac{1}{\sin \theta \cdot \cos \theta} = 2 \sec 2\theta$

$\cot \theta - \tan \theta = 2 \cot 2\theta$

~~$\frac{\cos \theta}{\sin \theta} - \frac{\sin \theta}{\cos \theta} = \frac{2 \cos 2\theta}{\sin 2\theta}$~~





110. If $x = \tan^{-1}(3/4)$ and $y = \tan^{-1}(5/12)$, then what is the value of $x + y$?

यदि $x = \tan^{-1}(\frac{3}{4})$ और $y = \tan^{-1}(\frac{5}{12})$ है तो, $x + y$ का मान क्या है?

(DELHI POLICE HEAD CONSTABLE 2025)

[A] $\tan^{-1}(\frac{63}{16})$

✓ [B] $\tan^{-1}(\frac{56}{33})$

[C] $\tan^{-1}(1)$

[D] $\frac{\pi}{2}$

$$\tan x = \frac{3}{4}$$

$$\tan y = \frac{5}{12}$$

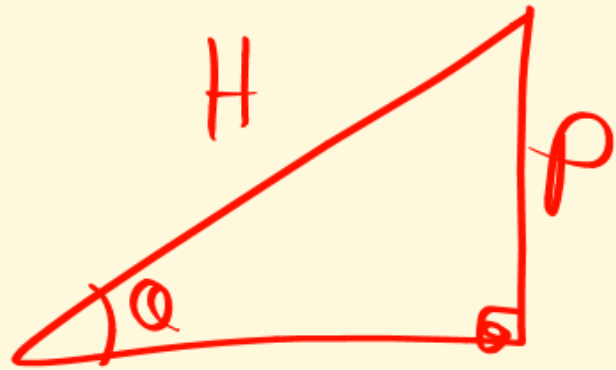
$$\tan(x+y) = \frac{\frac{3}{4} + \frac{5}{12}}{1 - \frac{3}{4} \times \frac{5}{12}}$$

$$\tan(x+y) = \frac{56}{33}$$

$$x+y = \tan^{-1}\left(\frac{56}{33}\right)$$



यदि $\sin \theta = \frac{a}{c}$
 $\Rightarrow \theta = \sin^{-1} \frac{a}{c}$



$$\tan \alpha = \frac{19}{7}$$
$$\alpha = \tan^{-1} \left(\frac{19}{7} \right)$$



111. What is the value of $\cos^{-1}\left(\frac{7}{25}\right) - \cos^{-1}\left(\frac{15}{17}\right)$?

$\cos^{-1}\left(\frac{7}{25}\right) - \cos^{-1}\left(\frac{15}{17}\right)$ का मान क्या है?

$\overset{=A}{\cos^{-1}\left(\frac{7}{25}\right)} - \overset{=B}{\cos^{-1}\left(\frac{15}{17}\right)}$
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[A] $\sin^{-1} \frac{304}{425}$

[C] $\tan^{-1} \frac{297}{425}$

~~[B] $\cos^{-1} \frac{297}{425}$~~

~~[D] $\cos^{-1} \frac{304}{425}$~~

$\cos A = \frac{7}{25}$

$\cos B = \frac{15}{17}$

$\cos(A-B) = \frac{7}{25} \times \frac{15}{17} + \frac{24}{25} \times \frac{8}{17}$

$\cos(A-B) = \frac{297}{425}$

